

Indonesian Food Policy Program

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Does Indonesia Face a Food Security Time Bomb?

BAPPENAS/DEPARTMEN PERTANIAN/USAID/DAI FOOD POLICY ADVISORY TEAM

JUNE 2002

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Food security has long been an important political goal in Indonesia. This goal is most commonly associated with rice self-sufficiency. In the mid-1980s Indonesia briefly achieved 100% self-sufficiency for rice. However, growth of rice production slowed in the 1990s, leading to an increase in imports and a lower self-sufficiency ratio. Over the past two years the rice self-sufficiency ratio has remained around 95%, but dropped below 90% during the El Niño drought of 1998.

The apparent inability of rice production to keep up with domestic demand has raised concerns that Indonesia could face a food emergency within ten years. According to a recent report, rice production is declining while demand for rice is rising, and if these trends continue there will not be enough rice on world markets by the end of the decade to feed Indonesia. Consequently, it is feared that Indonesia will face a “food security time bomb” (*Jakarta Post*, 4 May 2002).

The decline in rice production is frequently attributed to loss of rice fields caused by conversion to non-agricultural uses, and to declining productivity. One estimate reports that Indonesia’s rice fields have shrunk from 16.7 million hectares in 1983 to 14 million hectares at present. In response, the Ministry of Agriculture has proposed an ambitious target to open up 100,000 hectares of new paddy fields annually over the next eight years to avoid food shortages.

However, the assertion that rice production is declining, and that Indonesia is losing rice fields, does not appear to accord with available statistics from Indonesia’s national statistics agency (BPS). Data on rice production, the harvested area of rice and the amount of paddy land (*sawah*) show a continued upward trend. Moreover, the world rice market is far bigger today than it was fifteen years ago, and should be capable of supplying Indonesia’s residual import demand over the next decade and beyond, even without any new program to boost rice production. The probability of a food emergency developing over the next ten years therefore seems rather remote.

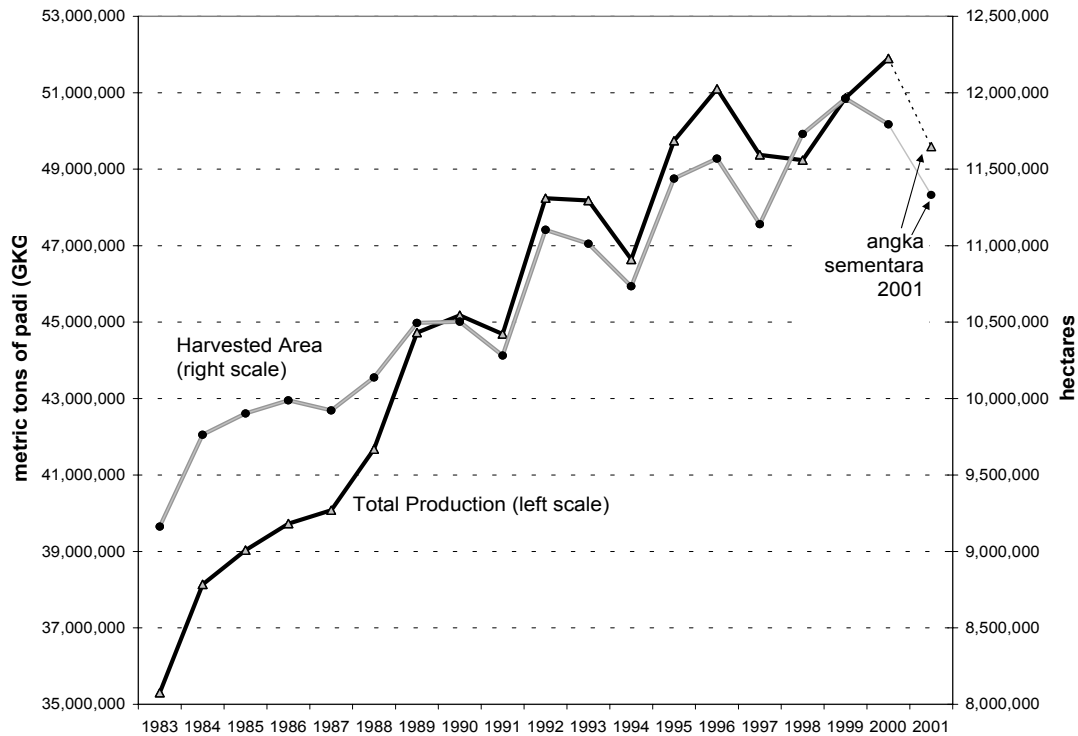
Since information on rice production trends and the amount of rice land does not appear to be widely disseminated in Indonesia, this note briefly reviews available statistics on these indicators and considers the likely balance between domestic production and domestic demand over the next ten years.

Rice Production and Harvested Area

Figure 1 on the next page shows annual data on rice production, measured in tons of paddy (*gabah kering giling*). The figure also shows harvested area (*luas panen*) measured in hectares, over the period 1983-2000. The data are taken from the BPS annual publication titled *Produksi Tanaman Padi dan Palawija di Indonesia*. As can be seen, rice production has increased steadily since the early 1980s, reaching an all time record high of 51.9 million tons (GKG) in 2000. Although growth was slower in the 1990s than in the 1980s, rice production in 2000 was 15% higher than in 1990.

Figure 1 also shows that harvested area of rice has grown steadily since the early 1980s, reaching a peak in 1999. Between 1990 and 2000, harvested area increased by 12%.

Figure 1. Rice Production and Rice Harvested Area, 1983-2000



Source: BPS, *Produksi Tanaman Padi dan Palawija di Indonesia*, various issues.

Table 1. Rice Production, 1969-2001 (*gabah kering giling*)

Year	Annual production (tons)	Percentage change	Year	Annual production (tons)	Percentage change
1969	18,013,000		1986	39,726,761	1.78%
1970	19,324,000	7.28%	1987	40,078,195	0.88%
1971	20,182,000	4.44%	1988	41,676,170	3.99%
1972	19,386,000	-3.94%	1989	44,725,582	7.32%
1973	21,481,000	10.81%	1990	45,178,751	1.01%
1974	22,464,000	4.58%	1991	44,688,247	-1.09%
1975	22,331,000	-0.59%	1992	48,240,009	7.95%
1976	23,301,000	4.34%	1993	48,181,087	-0.12%
1977	23,347,732	0.20%	1994	46,641,524	-3.20%
1978	25,771,000	10.38%	1995	49,744,140	6.65%
1979	26,283,000	1.99%	1996	51,101,506	2.73%
1980	29,651,905	12.82%	1997	49,377,054	-3.37%
1981	32,774,000	10.53%	1998	49,236,692	-0.28%
1982	33,583,677	2.47%	1999	50,866,387	3.31%
1983	35,303,106	5.12%	2000	51,898,852	2.03%
1984	38,136,446	8.03%	2001*	49,590,342*	-4.45%
1985	39,032,945	2.35%			

*estimate

Source: *Produksi Tanaman Padi dan Palawija di Indonesia*, BPS, various issues.

Preliminary data for 2001 (*angka sementara*) indicate that rice production dropped sharply last year. However, preliminary data often underestimate final production. As can be seen in Table 1, the preliminary data for 2001 represent the sharpest year-to-year decline in rice production in three decades, with the drop exceeding both the failed harvest of 1972 and the El Niño harvest of 1997/98. Since growing conditions for rice last year were favorable, there is no reason to suspect that Indonesia suffered a major decline in rice production in 2001. The fact that rice prices were stable during the first half of 2001 and rose only gradually toward the end of the year also indicates that there was no catastrophic harvest failure in 2001, as would be implied by the *angka sementara*. The preliminary figures are most likely an underestimate.

Harvested Area and the Multiple Cropping Index

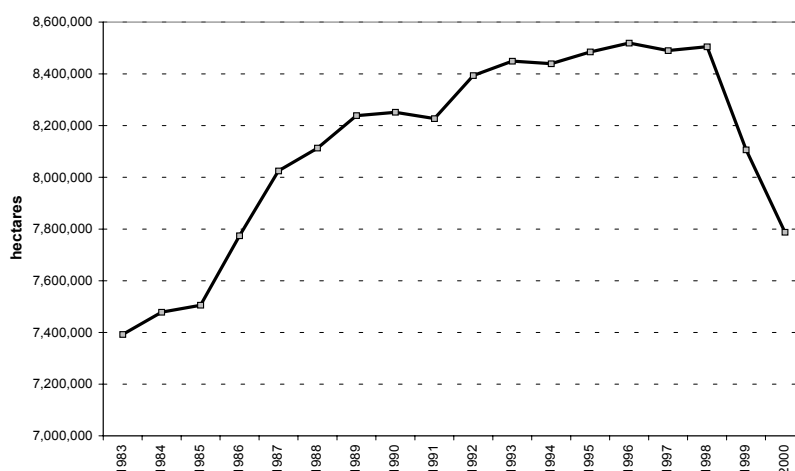
Figure 1 above shows that harvested area of rice has grown over the past twenty years, although growth was faster in the 1980s than in the 1990s. However, harvested area is a combination of two factors: the amount of land used for growing rice and the number of crops per year. If a farmer has two hectares of rice land (*sawah*) and he plants one hectare two times per year and the other hectare once per year, the farmer's harvested area is three hectares, and his multiple cropping index is $3 \div 2 = 1\frac{1}{2}$. If the multiple cropping index (MCI) is rising, it is possible for harvested area to grow even if total rice land is declining.

Unfortunately, Indonesia does not publish a multiple cropping index. It seems unlikely, however, that harvested area would have grown in the 1990s if the actual area of rice land was declining, as this would have required a rapid increase in the multiple cropping index. We are not aware of any study demonstrating a rapid increase in Indonesia's multiple cropping index for rice in the 1990s. Moreover, whether the growth of rice production and harvested area in the 1990s was due to an increase in the MCI, an increase in yields (tons per hectare) or an increase in rice land, is of secondary importance. The fact is that rice production is clearly on an upward trend, as shown in Figure 1.

In addition to harvested area of rice, the national statistical agency (BPS) publishes data on land use in an annual volume titled *Survei Pertanian: Luas Lahan Menurut Penggunaannya di Indonesia*.¹ This volume identifies the actual surface area of paddy fields (*sawah*) rather than the harvested area. The land use data show a steady increase in the amount of *sawah* in Indonesia, from 7.1 million hectares in 1980 to 8.5 million hectares in 1998 (see Figure 2). From 1998 to 2000 these data show a sharp drop in total *sawah*, from 8.5 million hectares to 7.8 million hectares. However, the entire drop occurs off-Java; *sawah* area on-Java actually increased from 1998 to 2000. Moreover, despite the drop in total *sawah* off-Java, rice production and rice harvested area off-Java increased between 1998 and 2000, as can be seen in Table 2. The reported decline in *sawah* area from 1998 to 2000 may therefore be a simple statistical error.

¹ The *Survei Pertanian* is a joint effort of BPS and the *Direktorat Jenderal Bina Produksi Tanaman Pangan Departemen Pertanian*. Both cropped area data and land use data are collected by the *mantri pertanian*, although on different forms and at different intervals.

Figure 2. Total sawah area (*luas lahan sawah*) in Indonesia, 1983-2000



Source: BPS, *Survei Pertanian: Luas Lahan Menurut Penggunaannya di Indonesia*

Table 2. Sawah area and harvested rice area on-Java and off-Java. 1998 and 2000

	Java		Off-Java	
	1998	2000	1998	2000
Luas Lahan Sawah (ha)	3,315,889	3,344,391	5,189,026	4,442,948
Luas Panen Padi (ha)	5,752,012	5,753,554	5,978,313	6,039,921
Produksi Padi (tons of GKG)	27,717,293	29,120,197	21,579,399	22,778,655

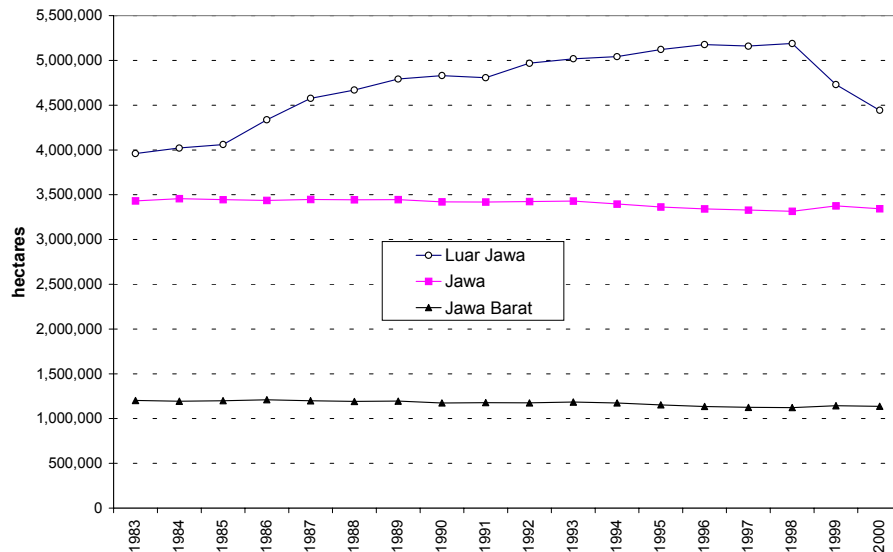
Source: *Luas lahan sawah* from BPS, *Survei Pertanian: Luas Lahan Menurut Penggunaannya di Indonesia*. *Luas panen padi and produksi padi* from BPS, *Produksi Tanaman Padi di Indonesia*.

Rice land in Java

While the total amount of rice land has risen over the past two decades, as measured both by rice harvested area and by the total area of *sawah*, there is a concern that Indonesia's most productive rice land on Java has been converted to non-agricultural uses, while less productive rice land has been opened up off-Java. Data on *sawah* area both on-Java and off-Java suggest that this is partly true (see Figure 3). However, the loss of *sawah* on-Java has been minor, with the total loss amounting to just 112,000 hectares between 1984 and 2000, or just 7,000 hectares per year. Even in West Java, which is Indonesia's most industrialized province, the loss of *sawah* between 1984 and 2000 has been minimal, amounting to just 3,500 hectares per year.²

² As reported in the annual volumes of *Survei Pertanian: Luas Lahan Menurut Penggunaannya di Indonesia* and in *Statistik Indonesia*.

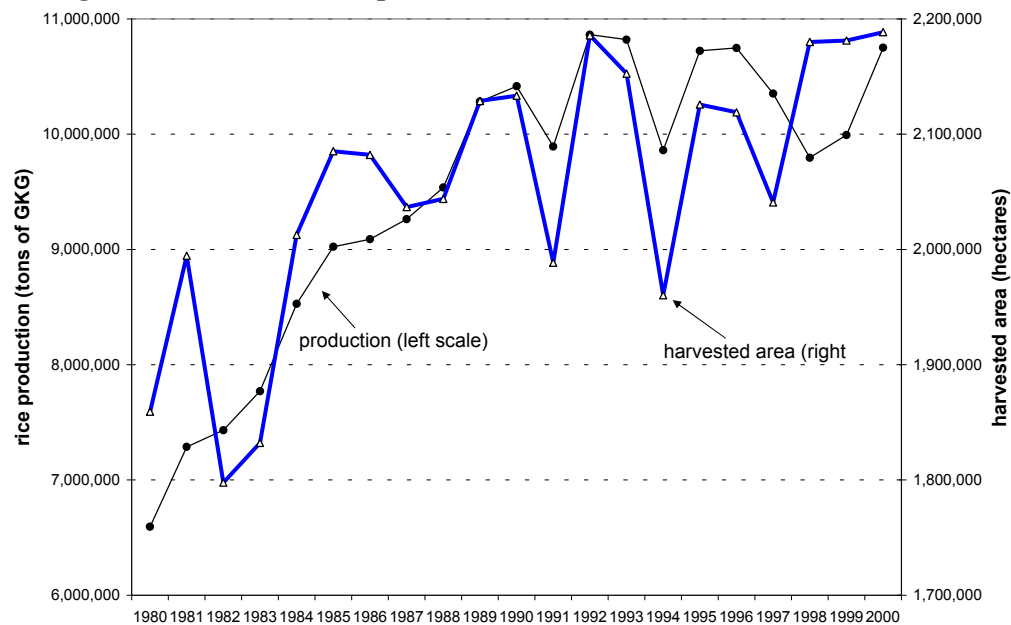
Figure 3. Sawah area on-Java and off-Java, 1983 to 2000



Source: BPS, *Survei Pertanian: Luas Lahan Menurut Penggunaannya di Indonesia*

Although the amount of *sawah* in West Java appears to have declined between 1984 and 2000, both rice production and rice harvested area in West Java have increased. As can be seen in Figure 4, rice production in West Java rose steadily until 1992 but thereafter stagnated. Harvested area, however, has continued to grow, reaching the highest level ever recorded in 2000. Consequently, *conversion of rice land to industrial uses does not seem to have been a major factor inhibiting rice production in Indonesia's most industrialized province.*

Figure 4. West Java rice production and rice harvested area, 1980-2000



Source: BPS, *Produksi Tanaman Padi dan Palawija di Indonesia*, various issues.

Rice Demand and Supply Over the Next Decade

Indonesia produced 51.9 million tons of paddy (GKG) in 2000, equivalent to 32.7 million tons of rice, and imported 1.5 million tons of rice.³ Domestic consumption in 2000 can therefore be estimated at 34.2 million tons. Paddy production rose by 15% between 1990 and 2000 -- an average annual growth rate of 1.4%. If this growth rate continues, paddy production will reach 59.7 million tons by 2010 (37.6 million tons of rice). Assuming that rice demand rises at the population growth rate of 1.35% per annum, total rice demand will reach 39.1 million tons in 2010. Thus, in 2010 Indonesia will need to import 1.5 million tons of rice – the same amount as in 2000. This hardly amounts to a food security time bomb.

Paddy production grew more slowly in the second half of the 1990s than in the first half, rising at an annual rate of 0.85% between 1995 and 2000. If this slower growth rate continues over the next ten years, paddy production would reach 56.5 million tons by 2010, or 35.6 million tons of rice. If demand for rice grows faster than population growth – say by 2% per annum – total rice demand would reach 41.7 million tons by 2010.⁴ Import demand would then be 6.1 million tons ($41.7 - 35.6 = 6.1$). This is very close to the actual rice import level in 1998. World rice trade reached 25 million tons in 1998, so even under this more pessimistic scenario, Indonesian import demand in 2010 would account for less than one-fourth of world rice exports. Experience in 1998 showed that six million tons of rice could be imported by Indonesia with only a minor impact on world rice prices. Consequently, ***there is no reason to fear that the world rice market will not be large enough to support Indonesian import demand, even with pessimistic demand and supply assumptions.***

These simple calculations show that under both a “baseline” scenario and a pessimistic scenario, Indonesia’s rice self sufficiency ratio will still exceed 85% by 2010, and rice import demand will be well within the capacity of the world rice market. There is therefore no reason to fear a food security time bomb.

³ Using a GKG to *beras* conversion factor of 0.63.

⁴ Indonesian rice imports were negligible in 1990, so demand was met by domestic production, which reached 45.2 million tons of GKG (28.5 million tons of *beras*) in 1990. Demand grew to 34.2 million tons of *beras* in 2000 (1.5 million tons of imports and 32.7 million tons of domestic production). This represents an annual average growth rate of 1.8%.